CLAIMS

The invention claimed is:

1. A method of compressing image data comprising the step of varying a magnitude of a quantization step as a function of a distortion of an image.

2. The method of claim 1 wherein the step of varying a magnitude of a quantization step as a function of a distortion of an image comprises the step of decreasing a range of lower frequency transform coefficient values included in a first quantization step relative to a range of higher frequency transform coefficient values included in a second quantization step as said distortion of said image increases.

3. The method of claim 1 wherein the step of varying a magnitude of a quantization step as a function of a distortion of an image comprises the step of decreasing a range of lower frequency transform coefficient values included in a first quantization step relative to a range of higher frequency transform coefficient values included in a second quantization step when said distortion of said image exceeds a threshold distortion.

4. The method of claim 1 wherein the step of varying a magnitude of a quantization step as a function of a distortion of an image comprises the step of decreasing a range of lower frequency transform coefficient values included in a first quantization step relative to a range of higher frequency transform coefficient values included in a second quantization step as a data rate decreases.

5. The method of claim 1 wherein the step of varying a magnitude of a quantization step as a function of a distortion of an image comprises the step of decreasing a range of lower frequency transform coefficient values included

in a first quantization step relative to a range of higher frequency transform coefficient values included in a second quantization step as a decrease in a data rate exceeds a threshold decrease.

6. The method of claim 1 wherein the step of varying a magnitude of a quantization step as a function of a distortion of an image comprises the step of decreasing a range of lower frequency transform coefficient values included in a first quantization step relative to a range of higher frequency transform coefficient values included in a second quantization step if a peak-to-mean amplitude of said distortion at least equals a frequency detection threshold of a basis function.

7. A method of quantizing image data comprising the steps of:

(a) transforming an image datum to a datum transform coefficient;

(b) measuring a distortion of an image;

(c) as a function of said distortion of said image, varying a range of a plurality of transform coefficients included between a lower frequency limit and a higher frequency limit of a quantization step;

(d) identifying a quantization step comprising a range of transform coefficients inclusive of said datum transform coefficient; and

(e) substituting for said datum transform coefficient a quantizer index representing said transform coefficients of said range included in said quantizer step.

8. The method of claim 7 wherein the step of varying said range of transform coefficients as a function of a distortion of said image data comprises the step of decreasing said range included in a first quantizer step comprising lower frequency transform coefficients relative to a range included in a second quantizer step comprising higher frequency transform coefficients as said

distortion of said image increases.

9. The method of claim 7 wherein the step of varying said range of transform coefficients as a function of a distortion of said image data comprises the step of decreasing said range included in a quantizer step comprising lower frequency transform coefficients relative to a range included in a second quantizer step comprising higher frequency transform coefficients if said distortion of said image exceeds a threshold distortion.

10. The method of claim 7 wherein the step of varying said range of transform coefficients as a function of a distortion of said image data comprises the step of decreasing said range included in a quantizer step comprising lower frequency transform coefficients relative to a range included in a second quantizer step comprising higher frequency transform coefficients if a peak-to-mean amplitude of said distortion at least equals a frequency detection threshold of a basis function.

11. The method of claim 7 wherein the step of varying said range of transform coefficients as a function of a distortion of said image data comprises the step of decreasing said range included in a first quantizer step comprising lower frequency transform coefficients relative to a range included in a second quantizer step comprising higher frequency transform coefficients as a data rate decreases.

12. The method of claim 7 wherein the step of varying said range of transform coefficients as a function of a distortion of said image data comprises the step of decreasing said range included in a first quantizer step comprising lower frequency transform coefficients relative to a range included in a second quantizer step comprising higher frequency transform coefficients a decrease in a data rate exceeds a threshold decrease.

13. A method of compressing an image comprising the steps of:

(a) separating data representing said image into a plurality of image data frequency sub-bands;

(b) transforming said data to a plurality of transform coefficients;

(c) mapping said transform coefficients to a plurality of quantizer indices, each said quantizer index comprising a plurality of digits arrayed from a most significant digit to a least significant digit;

(d) adding said most significant digits of said quantizer indices representing an image data frequency sub-band to a bitstream;

(e) repeating step (d) for a less significant digit of said quantizer indices until a number of significant digits specified by a truncation limit for said image data frequency sub-band is reached; and

(f) varying said truncation limit for at least two of said image data frequency sub-bands as a function of a distortion of said image.

14. The method of claim 13 further comprising the step of varying said truncation limit as a function of a frequency of said image data represented by said image data frequency sub-band.

15. The method of claim 13 wherein the step of varying said truncation limit for at least two of said image data frequency sub-bands as a function of a distortion of said image comprises varying said truncation limit to increase a number of

significant digits added to said bit stream for a lower frequency image sub-band relative to a number of significant digits added to said bit stream for a higher frequency sub-band as said distortion of said image increases.

16. The method of claim 15 further comprising the step of varying said truncation limit as a function of a frequency of said image data represented by said image data frequency sub-band.

17. A data quantizer for an image source encoder comprising:

(a) a comparator for comparing a transform coefficient to limits bounding a quantizer step;

(b) a weighting element to decrease a separation of said limits of a quantizer step to be applied to a transform coefficient representing a lower frequency component of said image data relative to a separation of said limits of a quantizer step to be applied to a transform coefficient representing a higher frequency component of said image data.

18. The apparatus of claim 17 wherein a separation of said limits of said quantizer step to be applied to a transform coefficient representing a lower frequency component of said image data is relatively less than a separation of said limits of said quantizer step to be applied to a transform coefficient representing a higher frequency component of said image data.